THE EXTENSION PATHOLOGIST

"To promote economic crop production, improve the quality of the products, and prevent wastage in storage, transit, and at the market."

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THE RELATION OF THE EXTENSION PATHOLOGIST TO PLANT-DISEASE SURVEY WORK.

By R. J. Haskell, Pathologist, Plant-Disease Survey, United States Department of Agriculture.

The first days following the arrival of an extension pathologist in a new State are often strenuous and sometimes even chaotic. In these days of high rents, much time may be spent in selecting a place to live. Then the family has to be moved, the railroad company sued for damages to the furniture, and the Ford put in the garage for much-needed repairs. After getting acquainted at the office, he turns his attention to the work at hand, and the progress that he makes during the next few months depends largely on two things - the help that other pathologists and members of the staff can give him, and the amount, quality, and availability of information concerning the crops of the State and their various diseases.

The problems of the extension pathologist are at the outset largely geographical. He wants to know the geography and physiography of the State; then he wants to know what the crops are, their importance in the agriculture of the State, the centers of their most intensive culture, and other facts regarding them; and finally, and more specifically, he wants to know what the diseases are, where they occur, where they do the most damage, their importance from the standpoint of the producer, and of course, the status of their control.

If the extension pathologist has the hearty cooperation and advice of men who have been in the State for many years and are familiar with the disease problems, and especially if they can select his particular projects for him, he is indeed fortunate. If he has not this advantage, however, or even if he has, he will find that this is where the Plant-Disease Survey will help him.

In many States, records are kept of material sent in to the Plant-Disease Survey. These records, covering a period of years, should be found in the files of the department of plant pathology, State department of botany, at the State college, and will give the pathologist the following information about the plant diseases of the State:

(1) Names of the diseases.
(2) Names of the organisms.
(3) Geographic occurrence of each in the State.
(4) The prevalence from year to year.
(5) Statements and estimates of losses in individual fields, towns, and counties, or in the entire State.
(6) Dates and places of earliest appearance each year.
(7) Weather relations.
(8) Varietal susceptibility.
(9) Success with control measures.
(10) Other information and references to publications.

The value of these records will depend upon the care and thoroughness with which they are prepared, as well as upon the number of them and the period of time covered. If this file is what it should be, by a study of it the extension pathologist will be able in a short time to obtain better than in any other way a grasp on the plant-disease situation in the State. He will be able to select his extension problems wisely, choosing those diseases that are causing the most loss, and for which control measures are known, and that for other reasons are particularly adapted for inclusion in the extension program.

In some States it has happened that survey files have not been maintained, and in certain instances they have been included with the property of the pathologist when he has moved away from the State. In such cases the Washington office may be able to render assistance by supplying the missing information. The Plant-Disease Reporter and the annual summaries of plant diseases in the United States also should prove useful in this connection. The extension pathologist will find also that the Plant-Disease Survey can be of help to him by furnishing special information of various kinds and by assisting in the identification of specimens.

Now, some of the ways in which the extension pathologist can help the Plant-Disease Survey may be mentioned. He, more than any other person on the staff in a State, is in a position to collect valuable information and specimens. Much of the time during the first two or three years of his stay in the State is spent in getting acquainted with plant-disease conditions. Why not make notes of these conditions and preserve them for further reference? By taking the time to make careful notes and frequent collections, he will add to the store of information, making it that much more valuable, and at the same time automatically will improve his own knowledge of plant diseases. It is realized that it is not easy to make survey notes and collect specimens while engaged on other business, but the man who succeeds in it will be doing a service to himself and to plant pathology.

I shall not suggest methods for note-taking or collecting, as each man has his own ideas about this and will use the methods that are most convenient for him. I would say, however, that the Washington office has a number of printed forms which can be used for notes, and which will be sent on request. We are also having specimen envelopes made for the use of collaborators.

Many letters and specimens come to the desk of the extension pathologist in the course of a year. It is very important that records of the disease information contained in these letters, and with the specimens, be preserved. Separate cards should be made out for each disease, and filed in the Plant-Disease Survey file. A card of a distinguishing color may be used for the specimens. In this way one will be able to determine at a glance just what information has been received on a given disease, and a summary will be easy at any time.

Practically all extension pathologists are collaborators with the Plant-Disease Survey, and in a number of States they are the chief collaborators. They have contributed some of the best information we have received. It is hoped this will continue and that they will pay even more attention to this phase of the work during the coming season. Now is the time to get the system for keeping records worked out and otherwise organized, so that when the season comes on, incoming information will be easily taken care of. The Washington office is always glad to receive suggestions for the improvement of its service, and hopes that you will feel free to call on it for whatever assistance it can render.

NOTE: This is the first of a series of articles dealing with matters related to methods of conducting extension work in plant pathology. In these papers, important points brought out in the outline published in the February number will be enlarged upon. It will be found helpful to keep that outline for reference purposes. F.C.M.

SWEET-POTATO DISEASE CONTROL IN KANSAS

The season is at hand for bedding sweet potatoes; consequently the subject of seed treatment is of particular interest at this time. In the following letter, Mr. E. A. Stokdyk, Extension Pathologist, tells of the successful introduction of measures for sweet-potato disease control in Kansas.

"Replying to your letter of February 15 regarding sweet-potato disease control work in the State, will say that we first undertook this work in the fall of 1921. Naturally we wanted first-hand information and some concrete suggestions for beginning this project, so we persuaded Dr. L. L. Harter to come to Kansas and spend a week with us in our fields, giving us demonstrations and lectures on the methods of sweet-potato disease control.

"Demonstrations were held in eight counties and at that time we took up principally seed selection for the control of stem rot. Of course many of the growers were skeptical and did not believe that it would be possible to control stem rot to any extent by seed selection. However, several men tried the method and, by selecting seed, they obtained increases in yield running from 60 to 95 bushels per acre.

"Of course the next thing to be taken up was the seed treatment for control of black rot. About 20 growers in the State tried this, and their results were very satisfactory. We were unable to get records on more than a few plots in the fall of 1922, but those that were obtained indicated a substantial increase in yield of fields from treated seed, as compared with untreated. In fact, some of the results were so outstanding that we had difficulty in explaining them.

"In 1923, however, the increase in yield by seed treatment was again outstanding, and is reported in the table below. The fact that we obtained an increased yield in cases where apparently no disease existed in either treated or untreated plots may be explained by the fact that seed treatment reduces the number of plants per potato, which makes the plants that do appear stronger than they would have been had the potato produced an immense number of plants.

"As far as black-rot control is concerned, it is apparent that seed treatment by the corrosive-sublimate method has largely reduced the loss in storage. In fact, many of our growers who have followed the practice for the past three years have stated that they believed they had cleaned up their black rot by treating for a three-year period.

"Seed treatment of sweet potatoes has been an easy thing to teach the grower because the measure takes very little time and is very simple. Last year in this State over 500 acres were planted from treated seed, and I shall make a guess that this year two-thirds of the commercial acreage in sweet potatoes will be from treated stock. The treatment has given us an avenue of approach on other lines of work in the sweet-potato game, and those who have taken up seed treatment are taking up better cultural methods and better storage methods. Mr. W. R. Beattie, extension horticulturist, has spent considerable time with us in this work the past year. His work and assistance have been greatly appreciated by the growers and the men at the college."

Results of sweet-potato seed treatment demonstrations, 1923.

County.	Growers.	Variety.	Yield on treated plot in bushels per acre.	Yield on untreated plot in bushels per acre	Increase due to treatment, bushels per acre.
Shawnee	C. M. Smith	Yellow Jersey	196	184	12
Finney	S. Carpenter	Yellow Jersey	174	87	87
Ford	W. Robbins	Yellow Jersey	247.3	192.7	54.6
Ford	W. Robbins	Nancy Hall	327	226	101
Ford	J. Fischer	Nancy Hall	269	180.8	88.2
Wyandotte	C. Speaker	Bit Stem Jersey	449.6	380.7	68.9
Total			1662.9	1251.2	411.7
Average			277.1	208.5	68.6

FIELD TEST OF MERCURIC-CHLORIDE SOLUTIONS IN POTATO-SEED TREATMENT

By L. J. Cross, Chemist,
State Research Laboratory, Ithaca, N. Y.

From weekly news letter concerning insect pests and plant diseases, April 9, 1923. Issued by Departments of Plant Pathology and Entomology, New York State College of Agriculture. Reprinted by permission of Doctor Cross.

It is a well-known fact that corrosive sublimate, when used for disinfecting potatoes, weakens rapidly with use. For this reason it is customary to recommend that the standard 1-1000 solution be used but three times. Even then the solution, after being used twice, may be less than half the strength of the fresh solution. In order to overcome this variation, some investigators advise the addition of one ounce of corrosive sublimate to 30 gallons of the original solution after each treatment until it has been used five times; then it should be discarded. While this method tends to keep up the strength of the solution more nearly to standard, the actual strength is not known, and may be either higher or lower than standard. In order to overcome these objections, the following method of testing the strength of the solution by the use of potassium iodide may be employed.

Solution needed: Five grams of potassium iodide should be dissolved in water and diluted up to 1000 cubic centimeters.

Apparatus: One 100-cubic-centimeter measuring cylinder.
One 25-cubic-centimeter measuring cylinder.
One beaker (200 to 500 cubic centimeters)
One liter bottle for KI solution.

Procedure: Measure out 25 cubic centimeters of KI solution and place in beaker. Fill the 100-cubic-centimeter measuring cylinder to the 100-cubic-centimeter mark with mercuric-chloride solution to be tested. Titrate by pouring small quantities at a time of the mercuric-chloride solution from measuring cylinder into beaker and shaking, until a permanent pink color or cloudiness is obtained. Note amount used.

A test should be made of the solution as made up, before treatment of potatoes is started, as a check on the concentrations of other solutions.

If solutions have been made up properly, it should take approximately 50 cubic centimeters of the 1-1000 (4 ounces to 30 gallons) mercuric-chloride solution to give the end point against 25 cubic centimeters of the KI solution.

The following table will indicate the approximate amounts of mercuric chloride to be added to 30 gallons of solution tested to bring the concentration up to standard, if solution of KI is made up and used as above outlined.

Cubic centimeters of HgCl2 solution used.	50	55	60	65	70	75	100
Ounces of HgCl2 to be added to 30 gals.	0	.4	.7	.9	1.1	1.3	2.0

If potatoes are dirty, it will be helpful to wash them off somewhat before placing them in the corrosive-sublimate solution. Even then the solution is certain to become cloudy after being used, so that it may be necessary to add two or three drops of a weak solution of copper sulfate to the potassium iodide to make the end point sharper when testing the solution.

When the solution in the tank becomes very dirty, as it will when hundreds of bushels are treated without changing the solution - some treat by passing the potatoes on a chain belt through a long tank containing the sublimate solution - it may be necessary to use only 10 cubic centimeters of the KI solution in the reacting beaker, and then the treating solution can well be poured from a 50-cubic-centimeter measuring cylinder. Of course the value of the KI solution should always be carefully obtained by the use of a known 1-1000 sublimate solution.

NOTE: Last spring, requests occasionally were received from the field for information concerning methods of testing the strength of corrosive-sublimate solutions that have been used for treating several lots of seed potatoes.

From all reports, the above method is one of the best which has been devised. We are informed that it has been used with good results in connection with the treatment of over 30,000 bushels of potatoes in western New York State. F. C. M.

HAVE YOU A QUESTION?

The suggestion has been made that we devote a section to questions and answers related to different matters presented by contributors. Believing that this might tend to bring out the kind of information concerning extension methods in which our readers are most interested, we intend to give the plan a trial. If you have a question concerning the work outlined in this number, please send it in to THE EXTENSION PATHOLOGIST. All questions received will be referred to the author of the article which inspired them, and opportunity will be given him in an early issue to discuss the subject on which information has been requested.

"HIDDEN FOES IN SEED POTATOES"

A one-reel motion picture, entitled "Hidden Foes in Seed Potatoes," was recently completed by the department, and is now ready for use by extension workers. In this film, which was prepared in cooperation with extension pathologists in New York State and New Jersey, an effort is made to call the attention of farmers to the desirability of planting seed potatoes which are free from such diseases as mosaic, spindling-tuber, and leaf-roll. Attention is called to the fact that freedom of seed stocks from these diseases must be determined by examination of plants in the seed field during the growing season.

Requests for use of this film should be directed to Office of Motion Pictures, United States Department of Agriculture, Washington, D. C.

EXTENSION LITERATURE.

During the December meeting of the American Phytopathological Society in Cincinnati, an informal conference of the majority of extension men present was held for the purpose of discussing policies to be followed in the development of our news sheet. It was suggested that it would be helpful if current extension literature on pathological subjects by the States could be listed in each issue. Those present volunteered to send in recent publications and to place the writer's name on the mailing list for all such material issued in the future. This will be filed in the office of THE EXTENSION PATHOLOGIST, and citations will be made in THE EXTENSION PATHOLOGIST of papers received. During the past month the following literature has reached this office:

Kansas:

Stokdyk, E. A., Directions for potato seed treatment. Kansas State Agri. Col. Ext. mailing folder; 1 p. illus. No date.

Washington:

Heald, F. D., Apple anthracnose. St. Col. of Wash. Ext. Bul. 64; 3 p. illus. June, 1920.

Dana, B. F., Peach leaf curl. St. Col. of Wash., Ext. Bul. 81; 7 p. illus. March, 1922.

_____ Potato seed disinfection. St. Col. of Wash. Soils and Crops Ext. Circ. 5; 1 p. mimeographed. No date.

Contributions or suggestions with regard to subjects that might profitably be discussed in this news sheet should be addressed to:

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